A MINING VEST

FIELD OF THE INVENTION

The present invention relates to clothing and in particular to clothing to be worn in a mining environment or any other environment where equipment needs to be carried leaving a wearer's hands free.

BACKGROUND ART

Underground coal miners are required to have or carry specific equipment for their own safety. Coal mines also vary in conditions, and as such, legislation only sets out guidelines under which all mines must operate. The policy and procedures are generally set by each mine depending on their conditions, but they must comply with the guidelines in the legislation.

As a result, the equipment as described in the following portion is specific to the mine and conditions best known by the inventors. However, similar equipment is required in other mine sites although it may not be exactly the same.

The equipment (or similar) described in this document is required under the Coal Mining Safety and Health Regulation (QLD) 2001 (the Regulation) enacted under the Coal Mining Safety and Health Act 1999.

Most miners carry their essential equipment on a belt secured around the user's waist. A fully equipped mining belt weighs approximately 16.75 kilograms. Some of the equipment that must be carried includes:

- P sonal Emergency Device (PED) and Cap Lamp battery - The battery powers the cap lamp used as a personal light source in the mine. Any person entering a coal mine is required under the Regulation to wear a cap lamp. The PED unit is located on the top of the cap lamp battery. In the event of an emergency, the PED can communicate withal persons underground simultaneously with information regarding the situation and, if required, instructions on evacuation procedures.

  The PED is one of the more modern forms of underground communications and is used only in some mines. Other sites do however have some type of communication device that they would need to carry.

- Self Rescuer – These items are a personal escape unit which are used

in the event of a fire or explosion. They provide the wearer with a source of breathable air for a duration of approximately thirty minutes, enabling the wearer to reach a longer capacity unit of fresh air. All persons entering a coal mine must be carrying some type of personal escape unit.

- Continuous Gas Monitoring Instrument – these are battery-powered units which continually monitor the immediate environment for hazardous gases at dangerous levels. Not all mine personnel are required to carry a continuous gas monitor. All Undermanagers and Deputies are required to carry one. Other personnel are also required to carry this instrument.
- Older Gas Detection equipment – older types of gas detection equipment used in conjunction with glass detection tubes are often carried. These tubes contain crystals that are sensitive to different types of gases and undergo a colour change when the gas is present. These devices do not require batteries or other power source and can generally monitor a wider range of gases than newer models.
- Whirling Hygrometer – this instrument is used to measure effective air temperature. Fans and air moving equipment are the only source of ventilation, temperature and humidity in an underground mine and conditions may vary widely. This device is used to monitor the safety of the work environment.
- Velometer – this instrument measures air velocity and is used to ensure that fans and air moving equipment are supplying adequate air to move gases and keep the temperature at a workable level.
- Tools – all mining personnel in an underground mine carry tools of some sort. These may be simple multi-purpose tools or specialist tools in the case of a tradesperson.
- Isolation Locks, Multi-locks and Safety Clips – All mines have some sort of isolation procedure and most mines use some kind of lock and key system. The isolation locks and multi-locks are used together to prevent or stop any person from operating or moving a machine or piece of equipment while another person is repairing it or is in a

dangerous position relative to the equipment.

- Personal Safety Wear – protective wear is required to be worn or carried by all personnel on a mine site. Miners usually carry hearing protection, dust masks, eye protection and gloves.

Reflective strips are also an essential part of the mining personnel's clothing as all mines require that any person going underground be visible from the front and back in a dark environment.

As can be seen from the above list, a miner is required to carry a lot of equipment. Generally, belts are used to carry all the equipment or to attach the equipment thereto. As can be appreciated, most miners use a belt as it allows them to keep their hands free to work. There are however, a number of problems with the belts.

Firstly, the belt has a limited amount of space in which to attach equipment. This can lead to items being difficult to find or attach. In an emergency situation, a miner may have so much safety equipment that his safety is at issue, as he may not be able to find the much-needed item quickly enough. As well as these problems, the items to be attached to the belt can fall off and become lost or are damaged by the fall. Some of the equipment to be carried is expensive and may also be fragile. These items can be damaged by knocking together or from impacts caused by striking the ground or other hard objects.

A miner may also tend to assume that the item he needs is attached to the belt. As there is so much equipment on the belt, a cursory visual inspection may not reveal that a smaller, but no less valuable item may be missing from the belt.

Also, the weight distribution of the belt may lead to problems. These problems may be physical, from carrying so much weight around for extended periods of time when there is no sharing of the load. The weight is always borne by the same muscles and this may lead to repetitive strain injuries or other long-term problems.

Other belts have attempted to address this problem by widening the belt, thus giving a larger weight distribution area, or by adding braces or shoulder straps which may be clipped to the belt. The shoulder straps can

become tangled upon removing them making it difficult to don the belt and shoulder straps conveniently. The shoulder straps can also become snagged or caught on projections.

As can be appreciated, a mine is a confined area and one in which moving around can be difficult. For this reason, miners often wear clothing that has a reduced chance of becoming caught on any projecting items.

These attempts to improve the belts however, have not overcome the problems. They have only moved the point(s) of weight bearing or created additional problems.

OBJECT OF THE INVENTION

The present invention is directed to a clothing article, which may at least partially overcome the abovementioned disadvantages or provide the consumer with a useful or commercial choice.

In its broadest form, the invention resides in a clothing article for attaching apparatus with increased availability and better weight distribution.

In one preferred form, the invention resides in a clothing article worn by miners for attaching apparatus with increased availability and better weight distribution which comprises at least one front portion and at least one rear portion, and at least one attachment means for the releasable attachment of equipment located on at least one of the portions.

According to a particularly preferred embodiment, the article comprises a clothing article to be worn by a user, a belt associated with the clothing article, the belt having attachment means for attaching equipment for use by the user, at least one pocket attached to the clothing article, and at least one attachment means, attached to the clothing article for the releasable attachment of equipment, the attachment means comprising a locking portion for attachment to the clothing article, the locking portion having a bore, and a resilient spring plate attached to the equipment for use by the user which may be removably located in the bore, the spring plate having a shoulder portion to abut the locking portion when in the bore, an angled portion to bias the spring plate and a locking rebate movable between a first locked position where the locking rebate abuts a lower edge of the bore to lock the spring plate in place

within the bore, and a second released position where the locking rebate is free from the lower edge of the bore.

According to a particularly preferred embodiment, the vest may or may not be worn with the belt. For instance, the vest may be worn without the belt and still accomplish the objects of the invention. The belt may or may not be attached to the vest. In a preferred embodiment of the vest may be a stand-alone article for use without a belt of any kind.

With the clothing article, the weight may be effectively moved from the hip area by transferring equipment normally attached to the belt to pockets or other attachment points positioned on the clothing article or belt. This feature combined with the back and shoulder support provided by the clothing article, leads to a more secure means for carrying mining equipment with increased availability and better weight distribution. Also the expensive items may be more securely fastened to the vest or they may be placed in pockets or similar pouches secured to the vest. Due to the more even distribution of the equipment items on the vest, the pockets or pouches can have flaps or other similar means that can be secured about the equipment to enhance the security of the items to the vest.

The clothing article may preferably take the form of a vest. The clothing article may suitably be manufactured from a durable fabric with sufficient strength to accomplish the attachment and support of heavy items without ruining it.

In a particularly preferred embodiment, the vest may comprise three portions, a back portion and two separate but releasably attachable side portions. The back portion may preferably be an approximately singlet shaped piece having an attachment means at each shoulder area for attaching each of the side portions. The attachment means may preferably be Velcro or the like.

The lower section of the back portion may preferably incorporate a lumbar support belt which is adapted to be wrapped about a wearer's lower torso. The lumbar support belt may suitably be releasably fastened about a wearer's torso using fastening means, for example Velcro fasteners or the like. The lumbar support belt may be flexible and is preferably at least slightly

resilient.

At least one portion of the lumbar support belt may have additional attachment means to attach the side portions of the vest to the back portion of the vest. Preferably this may make the vest size adjustable.

Each side portion of the vest may comprise attachment means at an upper portion to attach to the attachment means of the upper portion of the back portion of the vest. Each side portion of the vest may also comprise attachment means at a lower portion to attach to the attachment means provided on the lumbar support belt. All attachment means may preferably be Velcro or the like.

The clothing article may preferably have at least one support strap attached to it, which may provide better weight distribution. There will typically be two support straps.

The clothing article may suitably be available in a variety of sizes to suit a variety of users.

The clothing article may preferably be available in tight or loose fitting styles, but should not have any freely flowing or billowing sections to reduce the chance that the clothing article may be caught in machinery or other equipment.

The clothing article may include one or more reinforced areas to provide extra strength to the article. Preferably the shoulders of the clothing article may be one such reinforced area. The clothing article may suitably include one or more padded areas to increase the comfort of the wearer. The most preferred portions for padding are the shoulder regions and the hips. The padding may be of any type suitable for the purpose.

The clothing article may preferably possess at least one button, or a zip or Velcro in order to close the front or back of the clothing.

There may also preferably be a clip means associated with the clothing article when worn by a user, to attach or secure the cable running from the cap lamp to the cap lamp battery. The clip means may typically be attached to the back of the clothing article.

The support straps may preferably be attached to the clothing article. The support straps may also be integrally formed with the clothing

article. They may suitably be located as extending substantially around the trunk of the wearer of the clothing article. They may also be fully adjustable to allow a comfortable fit for a variety of wearers.

Each support strap may suitably possess a clip at the front of the clothing article when worn, to secure the support straps.

The belt may preferably be attached to the clothing article. The method of attachment may be releasable or permanent. This may allow the clothing article to assist in the bearing of the weight of the belt. The belt may also be formed integrally with the clothing article.

Preferably, the belt may be secured to the vest through the provision of elongate sleeve belt loops on the clothing article. These sleeve belt loops may be more effective than conventional belt loops for supporting a load. Each elongate sleeve belt loop may preferably be an extra portion of the fabric of the clothing article, attached to the clothing article in such a way as to provide a tube type sleeve through which the belt may be threaded.

The belt may suitably possess one or more attachment means for attaching equipment thereto. There may suitably be more than one type of attachment means associated with the belt. At least one of the attachment means may preferably be of the type whereby the equipment attached to it may be moved on the belt without removing the equipment item from the belt or its attachment to the belt.

The belt may preferably be manufactured from a strong, durable and supple material, preferably leather or an artificial material similar to leather. The belt may have one or more padded portions to increase wearer comfort. The belt may also possess an enlarged section at the rear for additional back support.

Preferably the movement of a number of the equipment items from the belt to the clothing article may allow the belt used according to the present invention to be smaller in dimension than a conventional mining belt. The belt may be thinner or smaller in one or both of thickness and height of the belt.

The pockets may preferably be of any size or shape. They may be formed of the same material as the clothing article or the belt. They may

preferably be sewn onto the clothing article but may be integrally formed with the clothing article. Ideally, they may be positioned about the clothing article in order to distribute the weight and not confine the equipment to a smaller area.

One or more reflective portions may preferably be associated with the clothing article.

The attachment means may suitably comprise a locking portion, the locking portion having a bore, and a resilient spring plate, attached to the equipment for use by the user, which may be removably located within the bore, the spring plate having a shoulder portion to abut the locking portion, an angled portion to bias the spring plate and a locking rebate movable between a first locked position where the locking rebate abuts a lower edge of the bore to lock the spring plate in place within the bore, and a second released position where the locking rebate is free from the lower edge of the bore.

The attachment means may preferably be associated with an article of clothing for the attachment of equipment. The attachment means may suitably be sewn or riveted to the clothing in order to secure the attachment means to the clothing.

The locking portion may preferably be formed of more than one part. Most preferably there may be a flat backing plate and a substantially U-shaped locking plate forming the bore when attached to the backing plate. The bore may preferably be rectangular in cross-section whether the locking portion is formed of one or more parts.

The locking portion may suitably be substantially flat on the clothing side in order to facilitate its attachment to the clothing article.

The locking portion may preferably possess rounded edges. The rounded edges may help reduce damage to both the clothing article and a user by reducing injuries through accidental bumping on sharp edges.

The locking portion may suitably be manufactured from a lightweight but strong and durable material, preferably metal or plastic. Of course, any material with suitable properties could be used.

Preferably, as mentioned above, the bore in the locking portion may be substantially rectangular in cross-section. This may allow the spring

plate to be located more easily in the bore. The rectangular shape may also allow for manufacture of the locking portion and spring plate more cheaply and more easily.

The spring plate may preferably be manufactured from a lightweight but strong and durable material, preferably metal or plastic. Of course, any material with suitable properties could be used.

The spring plate preferably has an upper portion for attachment to the equipment to be attached to the attachment means. The spring plate may also be attached using the upper portion to the cases of such equipment. The attachment to the equipment or cases may take any necessary form though sewing or riveting is preferred.

The shoulder portion of the spring plate may suitably be located at the top of the bore when in use. This may assist in the support of the equipment in the bore. The shoulder portion may also preferably abut the locking portion when the spring plate is located in the bore.

The shoulder portion may also be formed in a hook shape. In this aspect the hook shape may allow the equipment to which the spring plate is attached to hang from the locking portion even when not in its first locked position.

The spring portion may preferably possess rounded edges. The rounded edges may help reduce damage to the clothing and a user by reducing injuries through accidental bumping on sharp edges. It may also assist in the positioning of the spring plate within the bore in conditions of low visibility.

The locking rebate may preferably extend transversely across the spring plate. The locking rebate, when correctly positioned within the bore, may extend away from the clothing to which the locking portion is secured or towards it.

The spring plate may suitably be biased into the first locked position.

The spring plate may preferably be formed with a release portion adjacent the locking rebate which may facilitate the movement of the spring plate from its first position to its second position. The release portion may be

formed as a tab portion so that it may be pushed or pulled by a user's hand.

The release portion may be a part separate from the spring plate but associated therewith. In this form the release portion may extend through a slot in the spring plate and abut a lower portion of the spring plate. The slot may provide a pivot point about which the release portion may pivot and due to the abutment of the lower portion of the spring plate, moving the release portion may move the spring plate as well.

The release portion in this form may be attached to the spring plate either releasably or permanently. This attachment may be accomplished by any suitable means.

The release portion may be angled slightly away from the clothing to which the locking portion is attached, to facilitate either the location of the spring portion in the bore or for ease of manipulation by a user. The release portion may also be equipped with grip enhancing means.

In another preferred form, the invention resides in a mining vest which comprises a front and a rear portion, at least one pocket in the front portion, at least one attachment means in the front portion for the releasable attachment of equipment, and a mining belt which extends over a lower part of the mining vest and is attachable thereto.

Suitably, the front portion of the clothing article has a plurality of pockets. Pockets may also preferably be found on a rear or side portion of the clothing article for carrying additional or alternative equipment. The pockets can hold various safety devices.

The mining vest may be provided with at least one horizontal support strap. The support strap may extend from the rear portion of the vest to the front portion of the vest. The support strap may be provided with a buckle or other type of releasable attachment means. Suitably, a pair of spaced apart horizontal support straps are provided.

The mining vest as described above may suitably further comprise an optional safety harness. The safety harness may preferably be releasably attachable to one or more harness straps associated with the vest and/or the belt. Alternatively, the harness may preferably be integrally formed with the vest. Each harness strap may comprise a ring member or the like to

allow the attachment of the harness. The attachment of the safety harness and may preferably adapt the vest to be used as a safety harness when working at a height such as from raised platforms or for use in rescue situation such as working with rescue helicopters, for example.

The vest may preferably further comprise at least one mesh portion allowing the attachment of equipment and the like through the use of a "cable tie" arrangement. Cable tie arrangements are well-known in the field of defence force clothing and are used to attach equipment to army "fatigue" clothing.

The vest may also preferably further comprise a "camel back™" water storage or hydration system associated with the back portion of the vest. In the embodiment of the invention which is a single piece vest, the hydration system may be associated with the vest as a whole.

While the above description is directed toward the clothing article being a vest, it is to be appreciated that the clothing article may also take other forms such as for example, a jacket or other sleeved article of clothing.

BRIEF DESCRIPTION OF THE DRAWINGS

Various embodiments of the invention will be described with reference to the following drawings, in which:

Figure 1 is a front elevation of a preferred aspect of the clothing article in the form of a vest.

Figure 2 is a rear elevation of a preferred aspect of the clothing article in the form of a vest.

Figure 3 is an isometric view of the attachment means according to an aspect of the invention.

Figure 4 is a side view of the attachment means according to an aspect of the invention showing the spring plate disposed within the bore and free.

Figure 5 is a side view of the attachment means according to another aspect of the invention showing the spring plate disposed within the bore and free.

Figure 6 is a side view of the attachment means according to yet another aspect of the invention showing the spring plate disposed within the

bore and free.

Figure 7 is an elevation view of a multipart vest according to a particularly preferred embodiment of the invention.

Figure 8 is an elevation view of a multipart vest according to a particularly preferred embodiment of the invention.

BEST MODE

According to a first aspect, a clothing article for attaching equipment thereto with increased availability and improved weight distribution is provided.

According to the embodiment shown in Figures 1 and 2, the clothing article 30 comprises a vest 30 to be worn by a user having at least one releasable support strap 31 attached thereto for weight distribution, a belt 32 associated with the vest 30, the belt 32 having attachment means for attaching equipment 14 for use by the user, at least one pocket 33 attached to the vest 30, and at least one attachment means 10, attached to the vest 30 for the releasable attachment of equipment 14, the attachment means having a locking portion 11 for attachment to the vest 30, the locking portion 11 having a bore 12, and a resilient spring plate 13 attached to the equipment 14 for use by the user, the spring plate 13 having a shoulder portion 15 to abut the locking portion 11, an angled portion 16 to bias the spring plate 13 and a locking rebate 17 movable between a first locked position where the locking rebate 17 abuts a lower edge of the bore 18 to lock the spring plate 13 in place within the bore 12, and a second released position where the locking rebate 17 is free from the lower edge of the bore 18.

The vest 30 is manufactured from a durable fabric with sufficient strength to accomplish the attachment and support of heavy items without ruining.

The vest 30 does not have any freely flowing or billowing sections to reduce the chance that the vest 30 may be caught in machinery or other equipment.

The vest 30 possesses a zip in order to close the front of the vest 30.

There is also a clip 34 on the back of the vest 30 when worn by a

user, to attach or secure the cable 35 running from the cap lamp (not shown) to the cap lamp battery 36.

The support straps 31are attached to the vest 30. They extend substantially around the trunk of the wearer of the vest 30. They are also fully adjustable to allow a comfortable fit for a variety of wearers.

Each support strap has a clip attachment 37 at the front of the vest 30 when worn, to secure the support straps 31. Ideally there are two support straps.

The belt 32 is attached to the vest 30 to allow the vest 30 to assist in the bearing of the weight of the belt 32.

The belt 32 has a plurality of attachment means for attaching equipment 14 thereto. There is more than one type of attachment means associated with the belt 32. One of the attachment means is designed to allow the equipment 14 attached to it to be moved on the belt 32 without removing the equipment item 14 from the belt 32 or its attachment with the belt 32.

The belt possesses an enlarged section 38 at the rear for additional back support.

The pockets 33 may be of any size or shape. They are positioned about the vest 30 in order to distribute the weight and not confine the equipment 14 to a smaller area.

There are numerous reflective strips 39 spread over the front and rear of the vest 30.

According to a second aspect of the invention, the vest as illustrated in Figures 7 and 8 comprises three portions, a back portion 40 and two separate but releasably attachable side portions 41, 42. The back portion 40 is an approximately singlet shaped piece having an attachment means 43 at each shoulder area for attaching each of the side portions 41, 42. The attachment means 43 is Velcro or the like.

The lower section of the back portion 40 incorporates a lumbar support belt 44 which is adapted to be wrapped about a wearer's lower torso. The lumbar support belt 44 is releasably fastened about a wearer's torso using fastening means 45, for example Velcro fasteners or the like. The

lumbar support belt 44 is flexible and is also at least slightly resilient.

At least one portion of the lumbar support belt 44 is provided with additional attachment means 46 to attach the side portions 41, 42 of the vest to the back portion 40 of the vest to make the vest size adjustable.

Each side portion 41, 42 of the vest has attachment means 43 at an upper portion to attach to the attachment means 43 of the upper portion of the back portion 40 of the vest. Each side portion 41, 42 of the vest also has attachment means 43 at a lower portion to attach to the attachment means 46 provided on the lumbar support belt 44. All attachment means are Velcro or the like.

One possible configuration for an attachment means, for the releasable attachment of equipment 10 is also illustrated.

The attachment means as seen in Figures 3 and 4 comprises a locking portion 11, the locking portion 11 having a bore 12, and a resilient spring plate 13 attached to the equipment 14 for use by the user. The spring plate 13 has a shoulder portion 15 to abut the locking portion 11. It also has an angled portion 16 to bias the spring plate 13 and a locking rebate 17 movable between a first locked position where the locking rebate 17 abuts a lower edge 18 of the bore 12 to lock the spring plate 13 in place within the bore 12, and a second released position where the locking rebate 17 is free from the lower edge 18 of the bore 12.

Two parts form the locking portion 11, a flat backing plate 19 and a substantially U-shaped locking plate 20 which forms the bore 12 when attached to the backing plate 19. The bore 12 is rectangular.

The locking portion 11 has rounded edges to help reduce damage to the clothing and a user by reducing injuries through accidental bumping on sharp edges.

The rectangular bore 12 in the locking portion allows the spring plate 13 to be located more easily in the bore 12.

The shoulder portion 15 of the spring plate 13 is located at the top of the bore 12 when in use. This assists in the support of the equipment 14 in the bore 12. The shoulder portion 12 also abuts the locking plate 20 when the spring plate 13 is located in the bore 12.

The spring portion 13 possesses rounded edges to assist in the positioning of the spring plate 13 within the bore 12 in conditions of low visibility.

The locking rebate 17 extends transversely across the spring plate 13. The locking rebate 17, when correctly positioned within the bore, extends away from the backing plate 19 to which the locking plate 20 is secured.

The spring plate 13 has an upper portion 21 for attachment to the equipment 14 to be attached to the attachment means 10. The spring plate 13 may also be attached via the upper portion 21, to the cases of such equipment 14.

The spring plate 13 has a release portion 22 adjacent the locking rebate 17 to facilitate the movement of the spring plate 13 from its first position to its second position. The release portion 22 is formed as a tab portion so that it may be pushed or pulled by a user's hand.

The release portion 22 is angled slightly away from the equipment 14 to which the locking portion 11 is attached to facilitate either the location of the spring portion 13 in the bore 12 or for ease of manipulation by a user.

In another embodiment of the attachment means shown in Figure 5, the shoulder portion 15 is formed in a hook shape. In this aspect the hook shape allows the equipment 14 to which the spring plate 13 is attached to hang from the locking plate 20 even when not in its locked position.

In a further embodiment shown in Figure 6, the release portion 22 is a part separate from the spring plate 13 but attached thereto. In this form the release portion 22 extends through a slot 23 in the spring plate 13 and abut a lower portion of the spring plate 13. The slot 23 provides a pivot point about which the release portion 22 pivots and due to the abutment of the lower portion of the spring plate 13, moving the release portion 22 moves the spring plate 13 as well.

The release portion 22 in this form is attached to the spring plate 13 permanently.

In all embodiments of the attachment means illustrated, the

locking rebate 17 locks the spring plate 13 into the bore 12 by locking against the edge of the bore 12 furthest from the backing plate 19.

In the present specification and claims, the word "comprising" and its derivatives including "comprises" and "comprise" include each of the stated integers but does not exclude the inclusion of one or more further integers.